

7. In a visual display system that includes a display screen, a control box for controlling use of the display screen to display information, and a hand held remote control device for selectively controlling the display of information on the display screen by transmitting data to the control box, a method of generating a selected function on the display screen comprising the steps of:

emitting a signal from a first location;

receiving the signal with the remote control device at a second location,  
wherein the signal has an incident direction at the second location and the remote  
control device has a selected axis;

detecting an angular displacement between the incident direction of the signal and the selected axis of the remote control device;

transmitting data corresponding to the angular displacement to the control box; and

generating the selected function on the display screen in response to the transmitted data.

2. A method as defined in claim 1, further comprising repeatedly conducting the steps of:

moving the remote control device to establish a new angular displacement between the incident direction of the signal and the selected axis of the remote control device;

detecting the new angular displacement;

transmitting data corresponding to the new angular displacement to the control box; and

1 generating the selected function on the display screen in response to the  
2 transmitted data.

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4 3. A method as defined in claim 2, further comprising the step of filtering the  
5 transmitted data to at least partially prevent the selected function to be generated on the  
6 display screen in response to unintentional movement of the remote control device, wherein  
7 the unintentional movement has a magnitude less than a preselected threshold value.

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9 4. A method as defined in claim 1, wherein the step of generating the selected  
10 function on the display screen comprises positioning a cursor on the display screen, wherein  
11 the cursor moves on the display screen in response to changes in the detected angular  
12 displacement.

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14 5. A method as defined in claim 4, further comprising the step of selecting a  
15 scale factor such that movement of the cursor is selectively proportional to a unit change of  
16 the angular displacement.

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18 6. A method as defined in claim 5, wherein the step of selecting a scale factor  
19 comprises detecting an angle subtended by the display screen from the point of view of the  
20 remote control device, and adjusting the scale factor proportionally to the subtended angle.

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22 7. A method as defined in claim 1, wherein the step of detecting the angular  
23 displacement between the incident direction of the signal and the selected axis of the remote  
24 control device comprises detecting a first component of the angular displacement about a

first axis and further detecting a second component of the angular displacement about a second axis that is non-parallel to the first axis.

8. A method as defined in claim 1, wherein the step of receiving the signal with the remote control device comprises projecting the signal through at least one lens.

9. A method as defined in claim 1, wherein the step of receiving the signal with the remote control device comprises projecting the signal through at least one elongated opening in the remote control device.

10. A method as defined in claim 1, wherein:

- the method further comprises the steps of:
  - emitting a second signal from a second location; and
  - detecting a second angular displacement between the incident direction of the second signal and the selected axis of the remote control device; and
- the step of generating the selected function includes moving a cursor on the display screen in a direction based on information derived from the first angular displacement and the second angular displacement, regardless of the angular position of the remote control device about its central axis.

1           11. In a visual display system that includes a display screen, a control box for  
2 controlling use of the display screen to display information, and a hand held remote control  
3 device for selectively controlling the display of information on the display screen by  
4 transmitting data to the control box, a method of generating a selected function on the  
5 display screen comprising the steps of:

6                   holding the remote control device at a first angular orientation;

7                   receiving with the remote control device a signal generated at a first location  
8 separate from the remote control device;

9                   transmitting first data corresponding to the first angular orientation from the  
10 remote control device to the control box;

11                   generating a cursor on the display screen at a first position;

12                   reorienting the remote control device to a second angular orientation;

13                   receiving the signal with the remote control device;

14                   transmitting second data corresponding to the second angular orientation  
15 from the remote control device to the control box; and

16                   generating a cursor on the display screen at a second position, the second  
17 position being selected in response to an angular displacement between the first  
18 angular orientation and the second angular orientation.

1           12. In a visual display system that includes a display screen, a control box for  
2 controlling use of the display screen to display information, and a hand held remote control  
3 device for selectively controlling the display of information on the display screen by  
4 transmitting data to the control box, a method of generating a selected function on the  
5 display screen comprising the steps of:

6                   emitting a signal consisting of electromagnetic radiation from a first location;

7                   projecting the signal through a lens of the remote control device;

8                   projecting the signal onto a detector of the remote control device, wherein an  
9 amount of electromagnetic radiation of the signal that is received by the detector is a  
10 function of an angular displacement between a selected axis of the remote control  
11 device and an incident direction of the projected signal;

12                  detecting the amount of electromagnetic radiation that is received by the  
13 detector;

14                  transmitting data corresponding to the detected amount of electromagnetic  
15 radiation to the computer; and

16                  generating a selected function on the display screen in response to the  
17 transmitted data.

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19           13. A method as defined in claim 12, further comprising, after the step of  
20 projecting the signal through the lens, the step of projecting the signal onto a filtering  
21 structure that selectively removes a portion of the electromagnetic radiation from the signal.

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23           14. A method as defined in claim 13, wherein the step of projecting the signal  
24 onto the filtering structure comprises projecting the signal through a gradient density filter.

15. A method as defined in claim 13, wherein the step of projecting the signal onto the filtering structure comprises projecting the signal onto a reflective surface that selectively reflects the electromagnetic radiation.

16. A method as defined in claim 13, wherein the step of projecting the signal onto the filtering structure comprises projecting the signal onto a mask structure that selectively absorbs the electromagnetic radiation.

17. A method as defined in claim 12, wherein the lens comprises a substantially cylindrical lens.

18. A method as defined in claim 12, wherein the step of emitting the signal comprises modulating the signal.

19. A method as defined in claim 12, wherein the step of emitting the signal comprises encoding data into the signal.

20. A method as defined in claim 12, further comprising the steps of:

providing a measurement of the apparent intensity of the electromagnetic signal at the remote control device; and

normalizing the detected amount of the electromagnetic radiation with respect to the apparent intensity of the electromagnetic signal.

1           21. In a visual display system that includes a display screen, a control box for  
2 controlling use of the display screen to display information, and a hand held remote control  
3 device for selectively controlling the display of information on the display screen by  
4 transmitting data to the control box, a method of generating a selected function on the  
5 display screen comprising the steps of:

6           emitting a signal consisting of electromagnetic radiation from a first location;

7           projecting the signal onto the remote control device, wherein the signal has  
8 an incident direction at the remote control device and the remote control device has  
9 a selected axis oriented at an angular displacement from the incident direction;

10          projecting a first portion of the signal through a first substantially cylindrical  
11 lens, through a first filtering structure that selectively removes a first portion of the  
12 electromagnetic radiation from the first portion of the signal, and onto a first  
13 detector;

14          projecting a second portion of the signal through a second substantially  
15 cylindrical lens, through a second filtering structure that selectively removes a  
16 second portion of the electromagnetic radiation from the second portion of the  
17 signal, and onto a second detector, wherein the first substantially cylindrical lens  
18 has a first longitudinal axis that is non-parallel with a second longitudinal axis of  
19 the second substantially cylindrical lens;

20          detecting a first amount of electromagnetic radiation within the first portion  
21 of the signal using the first detector, wherein the detected first amount is a function  
22 of a first component of the angular displacement measured about the first  
23 longitudinal axis;

1 detecting a second amount of electromagnetic radiation within the second  
2 portion of the signal using the second detector, wherein the detected second amount  
3 is a function of a second component of the angular displacement measured about the  
4 second longitudinal axis;

5 transmitting data corresponding to the detected first amount of  
6 electromagnetic radiation and the detected second amount of electromagnetic  
7 radiation to the control box; and

8 generating a selected function on the display screen in response to the  
9 transmitted data.



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1 *filed* 22. A moveable remote control device for use in a visual display system that  
2 includes a display screen and a control box electronically connected to the display screen,  
3 the moveable remote control device transmitting to the control box angular orientation  
4 information of the moveable remote control device so that a selected function may be  
5 generated on the display screen, the remote control device comprising:

6 receiving means for receiving an electromagnetic signal emitted from a  
7 remote location;

8 orientation means for establishing an initial angular orientation of the remote  
9 control device, data corresponding to the initial angular orientation being  
10 transmitted from the remote control device to the control box;

11 first means for measuring a first component of an angular displacement of the  
12 remote control device about a first axis and relative to the initial angular orientation;

13 second means for measuring a second component of the angular displacement  
14 of the remote control device about a second axis and with respect to the initial  
15 angular orientation, the second axis being non-parallel with the first axis; and

16 transmitting means for sending data corresponding to the first component and  
17 the second component of the angular displacement to the control box.

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19 23. A remote control device as defined in claim 22, wherein the receiving means  
20 comprises means for selectively projecting a portion of the electromagnetic signal onto a  
21 surface of the remote control device.

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23 24. A remote control device as defined in claim 23, wherein the means for  
24 selectively projecting a portion of the electromagnetic signal comprises a first substantially

1 cylindrical lens having a first longitudinal axis and a second substantially cylindrical lens  
2 having a second longitudinal axis that is non-parallel with the first longitudinal axis.

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4 25. A remote control device as defined in claim 22, wherein the first means and  
5 the second means each comprises filtering means for selectively reducing the amount of  
6 electromagnetic radiation within the signal in response to the angular orientation of the  
7 remote control device.

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9 26. A remote control device as defined in claim 25, wherein the filtering means  
10 comprises a gradient density filter.

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12 27. A remote control device as defined in claim 25, wherein the filtering means  
13 comprises a first gradient density filter and a second gradient density filter oriented at about  
14 180° with respect to the first gradient density filter.

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16 28. A remote control device as defined in claim 25, wherein the filtering means  
17 operates using one or more of the physical processes selected from the group consisting of  
18 projection, absorption, focusing, reflection, refraction, and combinations of the foregoing.

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20 29. A remote control device as defined in claim 23, wherein the means for  
21 selectively projecting a portion of the electromagnetic signal comprises an elongated  
22 opening in the remote control device.

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30. A remote control device as defined in claim 22, wherein the first means and the second means each comprises detecting means for receiving and detecting an amount of electromagnetic radiation within the electromagnetic signal.

1 31. A computer input system for controlling the location of a cursor on a display  
2 screen, the computer input system comprising:

3 orientation means for establishing an initial angular orientation of a hand held  
4 remote control device;

5 first means for repeatedly detecting a variable first component of an angular  
6 displacement of the remote control device relative to the initial angular orientation  
7 by detecting an incident direction of an electromagnetic signal, wherein the first  
8 component of the angular displacement is measured about a first axis;

9 second means for repeatedly detecting a variable second component of the  
10 angular displacement of the remote control device by detecting the incident  
11 direction of the electromagnetic signal, wherein the second component is measured  
12 about a second axis that is non-parallel with the first axis;

13 transmitting means for sending data corresponding to the first component and  
14 the second component of the angular displacement; and

15 processing means for receiving the transmitted data and for generating a  
16 cursor on a display screen in response to the transmitted data.

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18 32. A computer input system as defined in claim 31, wherein the processing  
19 means comprises:

20 means for storing data relating to a reference angular displacement of the  
21 remote control device;

22 means for comparing the reference angular displacement to a new angular  
23 displacement, whereby an angular movement of the remote control device is  
24 determined; and

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means for selecting a cursor position on the display screen in response to the angular movement of the remote control device.

33. A computer input system as defined in claim 31, wherein the transmitting means comprises an emitter on the remote control device for emitting radiation selected from the group consisting of infrared radiation and radio frequency radiation and further comprises a corresponding receiver on the control box.

34. A computer input system as defined in claim 31, wherein the transmitting means comprises a cable extending from the remote control device to the control box.

35. A computer input system as defined in claim 31, further comprising an emitter at a first location for emitting the electromagnetic radiation, wherein the electromagnetic radiation is selected from the group consisting of infrared radiation and radio frequency radiation.

1 36. A computer input system for controlling the position of a cursor on a display  
2 screen, the computer input system comprising:

3 an emitter that emits an electromagnetic signal from a first location; and

4 a remote control device having a selected axis that is oriented at an angular  
5 displacement from an incident direction of a portion of the electromagnetic signal  
6 that strikes the remote control device, wherein the remote control device includes:

7 a first detector for detecting a first component of the angular  
8 displacement, the first component being measured relative to a first axis; and

9 a second detector for detecting a second component of the angular  
10 displacement, the second component being measured relative to a second axis  
11 that is non-parallel to the first axis.

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